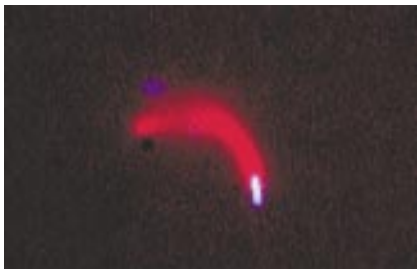

A *Listeria* bacterium (white) and its actin-filled comet (red) streak across the expanse of a cytoplasmic extract prepared from HeLa cells. Photograph courtesy of E. Friederich, Institut Curie, Paris.

microscopic observation with critical thinking to clarify complex problems.

My introduction to Tilney's *Listeria* papers came when I sought a post-doctoral position with Daniel Louvard at the Institut Pasteur in Paris. I had previously studied mitosis and wanted to learn about the behaviour of the actin cytoskeleton during mitosis, in particular at cytokinesis. I was directed to Louvard's associate, Evelyne Friederich, who had recently set up a project based upon studies of *Listeria*. She and others transfected human cultured cells with *actA* cDNAs with dramatic effects: the cells filled up with actin filaments and sent off numerous membrane-bound cytoplasmic extensions [2]. This result suggested that human cells have proteins that react specifically with ActA, so they might also have a natural ligand — a human ActA-like protein. The research project on offer was to identify ActA-like proteins of human cells using ActA-specific antibodies — a long way from my aim of studying cytokinesis.

But the project was enticing for several reasons. The laboratory had considerable experience in moving from cross-reacting antibodies to models of how a protein might function, and the evolutionary origins of the *actA* gene were in question because only two of the six *Listeria* species carry *actA* — the same two species that can form comets — suggesting that the gene might at one time have been acquired from another genome, possible mammalian. But it was a literature search on the subject that helped close the deal. Many of the papers on ActA cited Tilney in their introduction, including the seminal 1989 paper [1]. Upon reading this paper and remembering Tilney's seminars at MBL, I dropped the idea of studying cytokinesis to join Friederich's group and study ActA instead.

In the 1989 paper, Tilney and Portnoy wrote that their findings "should be exciting to cell biologists who want to know how actin filaments become organised in cells" [1]. Many authors throw in such a phrase about their results, but this time it was true. Studies of ActA have already uncovered a number of important cytoskeletal proteins: with Mary Beckerle, we found zyxin, while Trinad Chakraborty, Ulrich Walter and Jürgen Wehland and colleagues found that VASP (vasodilator stimulated phosphoprotein) binds to zyxin and to ActA, and the somewhat mysterious Arp2/3 complex of proteins resurfaced in Tim Mitchison's laboratory as being required for ActA-dependent actin polymerization — and all this was in just the first wave of molecular analysis of ActA.

Tilney has published other results on unusual properties of actin polymerization in a variety of species. I think it's safe to predict that there might still be a few turning points ahead for cell biologists who read his papers, even if they don't see comets.

References

1. Tilney LG, Portnoy DA: Actin filaments and the growth, movement, and spread of the intracellular bacterial parasite, ***Listeria monocytogenes***. *J Cell Biol* 1989, 109:1597-608.
2. Friederich E, Gouin E, Hellio R, Kocks C, Cossart P, Louvard D: Targeting of ***Listeria monocytogenes*** ActA protein to the plasma membrane as a tool to dissect both actin-based cell morphogenesis and ActA function. *EMBO J* 1995, 14:2731-2744.

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Web sequence gazing

I read *The spider's web* each month and have used much of the information it provides, even though I'm certainly no computer geek. I do DNA sequencing and am hooked into the UNIX system, but I find it baffling and extremely user-unfriendly. Can you can point me towards some moderately priced software that can be used to manipulate DNA sequences?

Ted Barna, 16 Creekfield Drive, Sumter, South Carolina 29154, USA.

The spider replies:
It's a while since we last covered sequence comparison or bioinformatics tools in *The spider's web* but you'll find 'Net sequence gazing' (*Current Biology* 1996, **6:**103) online at http://biomednet.com/cbiology/cub. If you're having trouble with UNIX, you could try UNIXhelp for Users at http://genome.wustl.edu/gsc/unixhelp/Unixhelp/TOP_.html. You could also try the following three 'traditional' entry points for collections of internet links to bioinformatics tools: Pedro's BioMolecular Research Tools at http://www.biophys.uniduesseldorf.de/bionet/research_tools.html; The WWW Virtual Library: Biomolecules (http://golgi.harvard.edu/sequences.html); and Bioinformatics Resources (http://www.genet.sickkids.on.ca/bioinfo_resources/).

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